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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1060(E)(M25)T
APRIL EXAMINATION

**NATIONAL CERTIFICATE: MULTI-DISCIPLINARY
DRAWING OFFICE PRACTICE**

**MECHANICAL AND DRAWING-OFFICE
ORIENTATION N4**

(8090184)

**25 March 2013 (X-Paper)
09:00–12:00**

CLOSED-BOOK EXAMINATION

This question paper consists of 5 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE: MULTI-DISCIPLINARY
DRAWING OFFICE PRACTICE
MECHANICAL AND DRAWING-OFFICE ORIENTATION N4
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. ALL the drawings must be of reasonable size, in good proportion and made in pencil.
 5. Write neatly and legibly.
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QUESTION 1: INTRODUCTION

- 1.1 Briefly explain any FOUR personal attributes of a draughtsperson with reference to problem-solving ability. (4)
- 1.2 Give any THREE qualities of good drawing paper. (3)
- 1.3 Give THREE characteristics (not the uses) of copper. (3)
- 1.4 Explain the difference between the readings on an inside and outside micrometer compared with the readings on a depth micrometer. (2)
- [12]**

QUESTION 2: DRAWING-OFFICE LAYOUT AND EQUIPMENT

- 2.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.
- 2.1.1 CAD electronic transmission and storage of information is better than a microfilm process. (1)
- 2.1.2 A drawing office can be considered as an extremely important link between the customer, the engineer and the final product. (1)
- 2.1.3 Scale rules must be of good quality to ensure accuracy. (1)
- 2.1.4 Drawing instruments should be packed away after use. (1)
- 2.1.5 Use a broom rather than a vacuum cleaner to clean drawing offices. (1)
- 2.2 State FIVE preventative maintenance routines with regard to drawing office equipment such as computers, fax machines, photostat machines and photo copiers which will prevent breakdowns. (5)
- [10]**

QUESTION 3: ENGINEERING MATERIALS AND HEAT TREATMENT

3.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

- 3.1.1 Copper is blue in colour. (1)
- 3.1.2 Lead has a reddish colour. (1)
- 3.1.3 Tin is silvery-white in colour. (1)
- 3.1.4 Aluminium is used in aircraft and automobile components. (1)
- 3.1.5 Brass is a combination of copper and zinc. (1)

3.2 State FIVE uses of copper. (5)

3.3 Name the FIVE important aspects to consider before starting a heat-treatment process on carbon steel. (5)

[15]**QUESTION 4: MACHINING**

- 4.1 State the names of any THREE cutters used on milling machines. (3)
- 4.2 Briefly explain a turning process. (2)
- 4.3 State any THREE safety rules that you have to comply with when using a lathe. (3)
- 4.4 What is the function of a chuck on a lathe? (1)
- 4.5 Give the name of the tool most commonly used to remove small amounts of material from an undersized hole. (1)

[10]**QUESTION 5: MEASURING INSTRUMENTS**

- 5.1 Give the names of THREE types of micrometers commonly used. (3)
- 5.2 Briefly explain the term *zero line*. (1)
- 5.3 State the name of the inventor of the modern micrometer. (1)
- 5.4 State the THREE types of shaft fits. (3)
- 5.5 Briefly explain the term *clearance*. (2)

[10]

QUESTION 6: KEYS, PULLEYS, CLUTCHES, COUPLINGS AND SCREW THREADS

- 6.1 Make a neat sectional drawing of a flange coupling. It is important to show the spigot and recess. Name all parts of the coupling. (8)
- 6.2 Give the proportional ratio used to calculate a key width. (1)
- [9]

QUESTION 7: BEARINGS AND LUBRICATION

- 7.1 State any THREE facts that should be considered before selecting a lubricant. (3)
- 7.2 Give FOUR disadvantages of ball and roller bearings. (4)
- 7.3 Apart from reducing friction state THREE other uses of lubricants in a machining system. (3)
- [10]

QUESTION 8: GEAR DRIVES

- 8.1 State any TWO advantages of planetary gears compared to normal spur gears. (2)
- 8.2 Make use of a freehand sketch to indicate the difference between 'circular thickness' and 'chordal thickness' on a gear tooth. (4)
- 8.3 Make use of TWO freehand sketches to indicate the difference between single spur gears and single helical gears. (4)
- [10]

QUESTION 9: VALVES, PUMPS AND PIPE FITTINGS

- 9.1 Make use of a neat sketch to show a sliding expansion-joint assembly. (8)
- 9.2 Briefly explain the operation of an automobile petrol-type pump during the intake stroke. (6)
- [14]

TOTAL: 100